EPA

United States
Environmental Protection
Agency

Office of Public Affairs
Region 5
230 South Dearborn Street
Chicago, Illinois 60604

Illinois • Indiana
Michigan • Minnesota
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Proposed Plan for the Pagel's Pit Superfund Site

Winnebago County, Illinois

April 1991

PUBLIC MEETING

Date: *Thursday, April 25, 1991*
Time: 7 p.m. - 9 p.m.
Place: *Howard Johnson*
Convention Center
3909 11th Street
Rockford, IL 61109

PUBLIC COMMENT PERIOD

April 16, 1991 - May 16, 1991

U.S. EPA AND IEPA PROPOSE A CLEANUP PLAN

A number of alternatives have been proposed as remedies for the landfill and groundwater problems at the Pagel's Pit site near Rockford, in Winnebago County, Illinois. The U.S. Environmental Protection Agency (U.S. EPA) and the Illinois Environmental Protection Agency (IEPA) have analyzed the proposed remedies and have developed this Proposed Plan. The purpose of this plan is to identify the preferred alternative and compare it to the other alternatives. U.S. EPA and IEPA are issuing this Proposed Plan as part of their public participation responsibilities under the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, commonly known as **Superfund**.

This document summarizes information from the **remedial investigation (RI)**, the **feasibility study (FS)**, and other documents contained in the **administrative record** for this site. The administrative record and documents pertaining to the site are located in the local repository at the Rockford Public Library, 215 North Wyman Street, Rockford, Illinois, and in the offices of U.S. EPA Region 5, 230 South Dearborn Street, Chicago, Illinois. U.S. EPA and IEPA encourage the public to review the documents in order to gain a better understanding of the site and the Superfund activities that have been conducted there.

In consultation with IEPA, U.S. EPA the lead agency, will select a remedy only after the public has had an opportunity to comment on the Proposed Plan and the comments have been reviewed and considered. The public is encouraged to review and comment on all of the alternatives outlined in the Proposed Plan. Comments received during the comment period and at the Proposed Plan public meeting will be addressed in a **Responsiveness Summary**. Based on new information or public comments, the preferred alternative may be modified. The selected remedy will be published in a **Record of Decision (ROD)** issued by U.S. EPA.

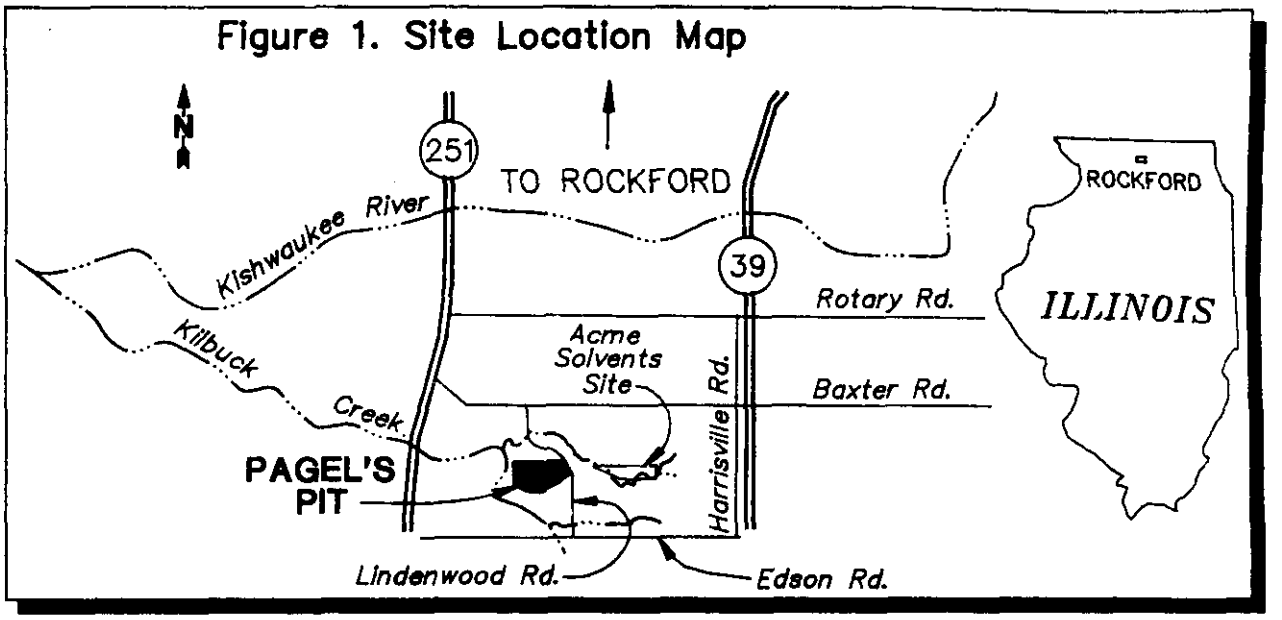
SITE BACKGROUND

The Pagel's Pit site (Winnebago Reclamation Landfill) is a landfill that occupies about 100 acres west of Lindenwood Road, south of Baxter Road, and about 5 miles south of Rockford, Illinois (see Figure 1). The site has limited access and is restricted by a chain link fence, by other fencing, and by natural barriers.

The landfill has been in operation since about 1972 and has an estimated 5 to 7 years of disposal capacity remaining. Municipal refuse and sewage treatment plant sludge have been the primary wastes accepted at the site. Limited amounts of Illinois **special wastes** have also been disposed of at the facility during its operation.

The landfill is located on a former sand and gravel quarry. It has been sequentially constructed and filled in several sections. Development has generally occurred in an east to west direction, first in the southern half and then in the northern half. The base of the landfill is now complete and covers approximately 47 acres. The landfill liner was constructed by grading and compacting the base and side walls of the landfill. Then asphaltic concrete was poured on the sides and floor and compacted, resulting in a 2-inch base. The surface of this base was covered with a cationic coal tar sealer. This sealed asphalt liner was then covered with 8-inches of sand. A network of perforated pipe was installed in the sand on the base of the landfill. The pipes were connected to manholes that collect liquid that has drained from the wastes. This liquid, called **leachate**, is pumped from the manholes to a leachate pond on top of the landfill where air is added. The leachate in the pond is periodically trucked to the wastewater treatment plant in Rockford.

(Words in bold are defined in the glossary on page 11).



Wastes to be disposed of in the landfill enter through the gate where there is a scale. The hauler takes the wastes to the working face of the landfill where they are unloaded. Since 1985, however, sewage sludge has first been dried at the on-site sludge drying plant before being placed in the landfill. Wastes are compacted into the active section of the landfill. A 6-inch cover is applied over the wastes daily; this generally consists of sand and clay with some gravel. When an area has been filled to an intermediate elevation, a compacted layer of additional suitable material is placed on the surface. An area will reach intermediate elevation when it has not received wastes for 60 days and the final permitted elevation has not been reached. Much of the present landfill is covered with an intermediate cover. Current plans are to bring the western end of the landfill up to the elevation of the eastern part of the landfill, which is about 790 feet above mean sea level (MSL). Then the entire surface will be filled to bring the final top grade to its full capacity of 820 feet above MSL. Proper side slopes will be maintained with this filling.

Around 1980, landfill gas, consisting primarily of methane and carbon dioxide, was discovered escaping from the landfill near Lindenwood Road. Five gas extraction wells were installed in the southeast corner of the landfill. A few months later, four additional wells were installed in the northeast corner. These wells were connected to a flare, that burned the gas off. In 1981, landfill gas was still escaping to the northeast of the landfill. Following this determination, the gas extraction system's operation and maintenance were upgraded. In 1984, these wells were replaced by a network of 70 wells located in the non-active portion of the landfill. The gas is collected from the wells and is used as a fuel source in the sludge drying operation. In November 1988, 21 additional wells were installed and connected to the system. These gas extraction wells are also used to remove leachate from the landfill. In this use, a gas extraction well is disconnected from the system and a portable pump is placed in the well. The pump transfers the leachate to the leachate pond.

The site was proposed to be included on U.S. EPA's National Priorities List (NPL) in October 1984, because the nearby groundwater was contaminated with arsenic, cadmium, and bis(2-ethylhexyl)phthalate. The NPL is the list of the nation's top priority hazardous waste sites eligible for long-term remedial evaluation and response. Comments opposing the proposed listing were received, but the site was added to the NPL in June 1986. U.S. EPA and several of the potentially responsible parties (PRPs) reached agreement on an Administrative Order by Consent, with an effective date of October 1986. This order requires the settling PRPs to conduct a remedial investigation and feasibility study at the site.

To the east of the Pagel's Pit site is the Acme Solvents site (see Figure 1). This site was proposed for the NPL in December 1982. From 1960 until 1972, the Acme Solvents site was used as a drum storage and disposal area for wastes, including waste paints, oils, solvents, and sludges. Disposal practices included emptying drums and tanker trucks into the Acme Solvents lagoons. A second ROD was signed for this site in December 1990. This ROD describes the approaches to be used to address the groundwater contamination resulting from site operations.

SUMMARY OF THE INVESTIGATION

During the remedial investigation for the Pagel's Pit site, areas on and around both the Acme Solvents site

and the Pagel's Pit site were studied. Additional monitoring wells were installed. Groundwater from the shallow aquifer was sampled at these wells and many of the other wells in the area. Water levels in many of the groundwater wells were measured. Samples of leachate were analyzed; samples of water and sediments in Kilbuck Creek, which flows past the western side of the Pagel's Pit site, were analyzed; and the air at the Pagel's Pit site was monitored.

The water table occurs in the fractured bedrock east and below the eastern quarter of the Pagel's Pit site. Under the remaining three quarters of the site and west of the site, the water table occurs in the unconsolidated materials, which consist predominantly of sand and gravel deposits with a thin silt or clay layer near the ground surface. Groundwater in the area generally flows from east to west, but in the southern part of the area, it flows slightly south of west. Some of the groundwater may discharge into Kilbuck Creek, but some of the groundwater flows under the creek.

Volatile organic compounds (VOCs) were found in the shallow aquifer on and in the vicinity of both sites. This aquifer serves several nearby residences as a source of water. Five residences with contaminated groundwater have been supplied with home carbon treatment units under a Consent Order with some of the Acme Solvents PRPs. The investigation of the Pagel's Pit site and the recent investigation of the Acme Solvents site reveal that the highest concentrations of VOCs have been found in several wells on and close to the Acme Solvents site. The next highest concentrations were found in several wells in the southeast corner of the Pagel's Pit site. A connection has not been established between the contamination on and near the Acme Solvents site and the contamination in the southeast corner of the Pagel's Pit site. Wells between these two areas either contained no VOCs or contained much lower VOC concentrations than were present in the two areas. The groundwater in the southeast corner is not included in this Proposed Plan for remedial action. A future study will be carried out to determine the nature and extent of the contamination there.

Leachate samples from the Pagel's Pit site contained relatively high concentration of chloride ion. This substance was selected as an indicator of areas of groundwater that might have been affected by leachate leaving the landfill. Based on the presence of elevated chloride ion concentrations, leachate from the landfill has been shown to be affecting the groundwater. The affected area extends about halfway around the western portion of the landfill. For the most part, the affected area is relatively close to the waste boundary, but a well on the other side of Kilbuck Creek contains some VOCs and exhibited elevated chloride concentrations.

Other inorganic substances were found in the groundwater at concentrations above the naturally occurring levels in the area. These included arsenic and barium, both of which are also present in the leachate.

Elevated levels of conductivity and alkalinity were found in the groundwater around the landfill, indicating that some substances were being added to this groundwater. The wells sampled included some wells around the landfill that are nominally upgradient and sidegradient from the landfill.

No upstream-downstream trends were noted in the sampling results of water and sediment from Kilbuck Creek. This indicated that the Pagel's Pit site was not affecting the water quality there.

Fifteen VOCs were detected during air monitoring. However, the data was of limited value because sample holding times were exceeded. The total of the highest concentrations of each of these VOCs found at any location was below the National Ambient Air Quality Standards for hydrocarbons, apparently the only applicable standard.

SUMMARY OF RISKS

A baseline risk assessment was prepared for the Pagel's Pit site to characterize the nature and estimate the magnitude of potential risks to public health and the environment. Potential risks are based on chemicals of concern and current and possible future land use. Under a current use scenario, surface water and sediment in Kilbuck Creek appear to pose the most likely point of chemical exposure to individuals living in the area. In this scenario, chronic and acute health effects would not be expected and cancer risks would be low.

The scenario representing the greatest risk to humans at the Pagel's Pit site involves the potential future use of groundwater as a water supply. Under this scenario, exposure to chemicals of concern occurs through ingestion or through inhalation and skin contact while bathing. In this scenario, the calculated cumulative hazard index is 5, not including cobalt exposure. Compared to the Superfund goal of 1, the index level indicates that exposure to noncarcinogens in the groundwater may cause adverse health effects. The majority of risk is due to exposure to the 1,2-dichloroethenes, thallium, and zinc. If cobalt exposure is included, the hazard index is 100; however, cobalt was found in only one well, and the hazard due to cobalt was based on an interim reference dose. The calculated cumulative cancer risk is 10 to 1,000 (1×10^{-3}) times greater than the U.S. EPA target risk range (10^{-4} to 10^{-6}). The majority of this risk is due to exposure to vinyl chloride and arsenic.

SCOPE AND ROLE OF THE REMEDIAL ACTION

The remedial action presented in this Proposed Plan addresses the wastes that have been disposed of at the site and the contaminated groundwater on and downgradient from the site. This Proposed Plan does not address the groundwater contamination in the southeast corner of the site. The contamination there will be addressed

in a separate Proposed Plan after additional studies have been conducted.

The purposes of the preferred remedial action presented in this Proposed Plan are: 1) to minimize further contamination of the groundwater at the site; 2) to prevent contact with the wastes; 3) to minimize the spread contaminants from the site through landfill gas emissions; and 4) to prevent the spread of contaminated groundwater downgradient from the site.

Several alternatives were analyzed in a feasibility study and are briefly summarized. Following these summaries, the preferred alternative is described. A brief assessment of all alternatives is also presented. This assessment is based on nine evaluation criteria that U.S. EPA uses to evaluate alternatives (see Table 1).

SUMMARY OF ALTERNATIVES

The alternatives that have been evaluated are as follows:

- ALTERNATIVE 1: No Action
- ALTERNATIVE 2: Planned Closure
- ALTERNATIVE 3: Clay-Synthetic Membrane Cap
- ALTERNATIVE 4: Off-Site Treatment of Groundwater and Leachate
- ALTERNATIVES 5 AND 5A: On-Site Carbon Adsorption Treatment of Water
- ALTERNATIVES 6 AND 6A: On-Site Air Stripping of Water
- ALTERNATIVES 7 AND 7A: On-Site Photolysis/Oxidation Treatment of Water
- ALTERNATIVE 8: In-Situ Landfill Waste Fixation

ALTERNATIVE 1: No Action

The Superfund program requires that the "no action" alternative be evaluated at every site to establish a baseline for comparison. Under this alternative, no further action would be taken at the site to address the problems that have been identified.

At this site, this no action alternative could occur only if the landfill suddenly shut down operations and failed to close as required by its permit. The leachate collection and gas management systems would no longer be operated. The contamination of the groundwater would continue, and there would be no provisions for preventing future development on or near the site.

ALTERNATIVE 2: Planned Closure

Under this alternative, the site would be properly closed when it reached capacity or when a decision was made by the operator to close it early. An Illinois sanitary landfill final cover system and an upgraded landfill gas extraction system would be constructed at the site. The leachate collection system would be operated, and the leachate would be sent to the local publicly owned treatment works (POTW) for treatment before being discharged, as is done now. The groundwater would be monitored. The site would be properly cared for according to the terms of its operating permit.

ALTERNATIVE 3: Clay-Synthetic Membrane Cap

The wastes would be covered by a **Resource Conservation and Recovery Act (RCRA)** Subtitle C compliant hazardous waste cap that would reduce the infiltration of water into the wastes to very low levels and, therefore, reduce the amount of leachate. This cap might consist of two feet of compacted clay on top of the wastes, covered by a synthetic membrane, a sand drainage layer, a geotextile fabric, a soil layer (root zone), top soil, and grass.

An upgraded landfill gas extraction system would be installed. The current leachate extraction system would be upgraded by installing permanent pumps in manholes and in selected gas extraction wells. The leachate would be sent to the local POTW by means of a force main connected to an existing sanitary sewer line, after undergoing any pretreatment required by the POTW. The POTW would treat the leachate before final discharge.

Deed restrictions, monitoring, and maintenance would apply.

ALTERNATIVE 4: Off-Site Treatment of Groundwater and Leachate

In this alternative, contaminated groundwater and landfill leachate would be extracted and sent to the local POTW for treatment. The combined stream would be sent to the POTW by means of a force main connected to the sanitary sewer. The groundwater extraction system described previously would be used to extract the groundwater. The leachate would be extracted using the system described in Alternative 3.

An Illinois sanitary landfill final cover system and an upgraded landfill gas extraction system would be constructed at the site. Deed restrictions, monitoring, and maintenance would apply.

ALTERNATIVES 5 AND 5A: On-Site Carbon Adsorption Treatment of Water

In Alternative 5, extracted groundwater would be treated on site to remove

Table 1. Nine Criteria for Detailed Analysis of Alternatives	
1	*Overall protection of human health and the environment.* The assessment against this criterion describes how the alternative, as a whole, achieves and maintains protection of human health and the environment. This assessment draws on the assessments of other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness, and compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
2	*Compliance with ARARs.* The assessment against this criterion describes how the alternative complies with ARARs, or if a waiver is required, how it is justified. The assessment also addresses other information from advisories, criteria, and guidance that U.S. EPA and IEPA have agreed to consider.
3	*Long-term effectiveness and permanence.* The assessment against this criterion evaluates the long-term effectiveness of alternatives in maintaining protection of human health and the environment after response objectives have been met, along with the degree of certainty that the alternative will prove successful.
4	*Reduction of toxicity, mobility, or volume through treatment.* The assessment against this criterion evaluates the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.
5	*Short-term effectiveness.* The assessment against this criterion examines the effectiveness of alternatives in protecting human health and the environment during the construction and implementation of a remedy until response objectives have been met.
6	*Implementability.* This assessment evaluates the technical and administrative feasibility of alternatives and the availability of required goods and services.
7	*Cost.* This assessment evaluates the capital and operation and maintenance (O&M) costs of each alternative.
8	*State acceptance.* This assessment evaluates the issues and concerns the state may have regarding each of the alternatives. This criterion is primarily addressed in the ROD, after comments have been received on the Proposed Plan, the remedial investigation report, and the feasibility study report.
9	*Community acceptance.* This assessment evaluates concerns the public may have regarding each of the alternatives. This assessment is primarily addressed in the ROD, after comments received have been evaluated.

VOCs and **semivolatile organic compounds (SVOCs)** by carbon adsorption. The contaminated water would be pumped through two vessels containing activated carbon. Used carbon would be shipped off site for regeneration or disposal. A sand filter would be used to pretreat the water going to the carbon adsorption vessels to remove suspended solids. Ion exchange or coagulation/flocculation would be added for inorganics removal if required to meet discharge requirements or to prevent interference with the organic treatment process. The treated water would be discharged into Kilbuck Creek. This water would be sampled periodically to ensure that discharge requirements were being met. The leachate would be transferred to the local POTW as in Alternative 3.

In Alternative 5a, both the groundwater and the leachate would be treated on site by carbon adsorption preceded by sand filtration. The leachate would be pretreated for removal of turbidity, solids, and inorganics by pH *adjustment, precipitation, flocculation,* and sedimentation.

These two alternatives are the same as Alternative 4 except that treatment replaces transfer to the local POTW.

ALTERNATIVES 6 AND 6A: On-Site Air Stripping of Water

Alternatives 6 and 6a are identical to Alternatives 5 and 5a, respectively, except that air stripping would be used in place of carbon adsorption. In addition to the air stripping, carbon polishing of the water leaving the air stripper might be required to meet discharge limits. The air stripping system removes volatile contaminants from the groundwater by forcing the water through a packed column. As the water flows one way, air flows in the reverse direction, and the volatile contaminants in the water are transferred to the air. Expected air emissions from the column would be low enough that treatment of the vapors would not be required. However, if the remedial design study determined that the vapors would need treatment, appropriate controls would be added. The discharges from the air stripper would be subject to the approval of IEPA.

ALTERNATIVES 7 AND 7A: On-site Photolysis/Oxidation Treatment of Water

Alternatives 7 and 7a are identical to Alternatives 5 and 5a, respectively, except that photolysis and oxidation would be used in place of carbon adsorption. An ultraviolet photolysis process enhanced by the introduction of ozone or hydrogen peroxide would be used to oxidize the organic contaminants in the water. The treatment unit would consist of a tank with ultraviolet fixtures installed inside.

ALTERNATIVE 8: In-Situ Landfill Waste Fixation

In this alternative, the landfill wastes would be solidified in place (in-situ) by injecting a **reagent** slurry into the closed landfill. In this fixation process, the wastes are treated by boring into the landfill and adding the reagents. Each boring creates a column of treated material circular in cross section. The wastes are transformed into a stable, solidified mass by the process.

Groundwater would be extracted and treated on site by air stripping in Alternative 6. There would be no cap with this alternative and no gas or leachate extractions systems. Deed restrictions would be implemented and groundwater monitoring and care of the site would be performed.

Common Elements

There are some common components in several of the alternatives. Alternatives 2, 4, 5, 5a, 6, 6a, 7, and 7a include an Illinois sanitary landfill final cover system for the wastes that have been deposited at the site. This cover system would meet the recent regulations adopted by the State of Illinois. The cover would be constructed of a low permeability layer followed by a final protective layer. The low permeability layer would consist of a compacted earth layer at least 3 feet thick and would have a permeability that would be no greater than 10^{-7} centimeters per second (0.1 feet/year). Any alternative to this cover would have at least the performance of this system. The protective layer would consist of soil capable of supporting vegetation, would be at least 3 feet thick, and would protect the low permeability layer from freezing. The final slopes of the cover system would be at a grade capable of supporting vegetation, limiting erosion, and preventing accumulation of water on the cover. The cover would be maintained after installation.

In all of the alternatives except Alternatives 1 and 8, the current landfill gas extraction system would be *upgraded. The newest 21 wells would* probably be retained, but would be extended upward to accommodate the increased height of the landfill. The other extraction wells would be replaced with new wells, and additional new wells would be placed in the newer portions of the landfill. The need for gas extraction wells at the perimeter of the landfill would be evaluated, and wells would be installed if necessary. Landfill gas would continue to be used as a fuel or would be flared.

Alternatives 4 through 8 include a groundwater extraction system. The purpose of the system is to prevent contaminated groundwater from migrating west of the waste disposal area. Groundwater would be extracted in a series of wells installed near the western boundary of the site. These wells would be sized and spaced to capture the contaminated groundwater flowing from the vicinity of the waste disposal area. The line of extraction wells would stop the advance of the contaminated

groundwater. It is expected that the groundwater extraction system would have to operate many years before the contamination in the groundwater at the site boundary would decrease to acceptable levels. At the present time it is not possible to satisfactorily estimate this time period. The water taken from these wells would be disposed of in different ways in the various alternatives. The descriptions of the alternatives provide further details.

In Alternatives 3 through 7a, deed restrictions for property development and new well development on and adjacent to the landfill would be implemented. Monitoring of groundwater, surface water, landfill gas, and the cover system would be carried out and all systems would be properly maintained.

The estimated capital costs, costs for annual operation and maintenance (O&M), and total **present net worth** costs for the alternatives are given in Table 2.

Time Required for Implementation

The time required to implement any of the various remedial actions is comparable. The cover system would be constructed after waste capacity had been reached or a decision to close the landfill early had been made. If, however, the rate of waste disposal fell significantly so that the time for closure would extend more than a few years beyond the presently estimated years of remaining capacity, closure would be implemented before capacity was reached. The cover system would be installed as the wastes reach final elevations, with construction of the cover system beginning well before final closure of the entire landfill. The cover system would be maintained as long as necessary. The fixation process would be implemented on much the same schedule as the final cover system.

The groundwater extraction system would be installed within an estimated 2 to 3 years after the system had been selected. As stated before, the length of time this system would have to operate cannot be estimated at this time. The landfill gas extraction system would be operated until only a negligible amount of gas was being produced. The leachate extraction system would be operated until rainwater no longer leached contaminants out of the wastes.

As required by CERCLA, a review of the remedial action selected would be conducted at least every five years after the beginning of the remedial action since wastes are being left at the site. With the no action alternative, this review would probably require some minimal amount of sampling and analysis of the groundwater, but the costs for this sampling have not been included for this alternative.

THE PREFERRED ALTERNATIVE

The alternative presently preferred by U.S. EPA and IEPA is either Alternative 5 or 6. Alternative 5 includes a sanitary landfill cover for the waste disposal area; groundwater extraction along the west side of the site; on-site groundwater treatment by carbon adsorption following pretreatment with a sand filter; treatment for removal of inorganics if necessary, with the treated water discharged into Kilbuck Creek; leachate extraction and transfer to the local POTW for treatment; gas extraction and using the gas for fuel or flaring it; and deed restrictions. Alternative 6 is the same except that air stripping is used in place of carbon adsorption.

Selection of Alternatives 5 or 6 will be determined during the remedial design. At this time additional information will be available concerning the level of groundwater contamination in the feed stream to the treatment process. If studies show that these groundwater treatment methods would not provide sufficient removal of the contaminants, then one of the other methods discussed in this Proposed Plan would be studied. If the leachate were not accepted by the local POTW, then one of the on-site treatment systems discussed here would be studied and used if it was determined to be satisfactory.

Following the selection of the remedy, the groundwater extraction system and groundwater treatment system would be installed as soon as possible. The sanitary landfill cover, would not be installed until the landfill reached capacity, closed early, or was filling at a level below a preset rate. A leachate extraction system is in place, and leachate is being removed from the landfill and sent to the POTW. The system would not be upgraded until the filling of the landfill allowed it. A gas extraction system is in place, and it also would not be upgraded until the filling of the landfill allowed.

EVALUATION OF ALTERNATIVES

This section compares the preferred alternative to the other alternatives with regard to the nine evaluation criteria (see Table 1).

1. **Overall Protection of Human Health and the Environment**

All of the alternatives except Alternative 1 (No Action), Alternative 2 (Planned Closure), and Alternative 3 (Clay-Synthetic Membrane Cap) provide adequate protection of human health and the environment. Alternatives 1, 2, and 3 do not include groundwater extraction and treatment. The groundwater would be remediated until **maximum contaminant levels (MCL)**, proposed MCLs, and non-zero **maximum contaminant level goals (MCLG)** are reached, as appropriate. When necessary, a carcinogenic risk of 10^{-5} and a cumulative hazard index of 1 would be used. All of the alternatives except Alternative 1 provide adequate protection from contact with the wastes. Likewise, all of the alternatives except Alternative 1 provide protection from the release of contaminants through gas and leachate extraction; however, Alternative 2 might not provide this protection for as long a period as Alternatives 3 through 8.

Table 2. Estimated Costs, Remedial Action, Pagel's Pit Site

Alternative	Capital Costs ($)	Annual O&M Costs ($)	Present Net Worth ($)
1	0	0	0
2	5,170,000	149,000	7,500,000
3	10,850,000	147,000	13,100,000
4	5,850,000	293,000	10,400,000
5	6,240,000	310,000	11,000,000
5a	6,620,000	439,000	13,400,000
6	5,960,000	248,000	9,800,000
6a	6,400,000	296,000	11,000,000
7	6,360,000	327,000	11,400,000
7a	6,940,000	463,000	14,100,000
8	985,000,000	204,000	989,000,000

Note: Alternative 1 (No Action) has no specific capital costs, assuming that there will be no periodic sampling and analysis.

2. Compliance with Applicable or Relevant and Appropriate Requirements

All alternatives except Alternatives 1, 2, 3, and possibly 4, should be able to meet the identified **applicable or relevant and appropriate requirements (ARARs)**. Alternatives 1, 2, and 3 leave contaminated groundwater in place allowing it to continue to move away from the site. If RCRA wastes have contaminated the groundwater at the Pagel's Pit site, then RCRA ARARs may apply to the remediation of the groundwater. This also means that any residue from the treatment of this groundwater would be a listed waste under RCRA and would have to be treated accordingly. The on-site treatment of the groundwater should be able to meet these ARARs, but these ARARs might make it impossible to send the groundwater to the local POTW for treatment (Alternative 4).

3. Long-term Effectiveness and Permanence

Alternative 8 could provide the highest degree of long-term effectiveness and permanence because the fixation process could greatly reduce the mobility of the contaminants in the wastes. However, this is a relatively new technology, and testing would be required to determine its effectiveness at this site. The final landfill cover system included in all of the alternatives except 1 and 8 provide long-term effectiveness with proper maintenance. The cover reduces the mobility of the contaminants by covering the wastes and reducing water infiltration. Groundwater extraction and treatment provide long-term effectiveness by removing contaminants from the groundwater and preventing the spread of this contamination. Air stripping and carbon adsorption are processes that have been proven to be generally reliable. Management of the landfill gas and leachate provides long-term effectiveness by reducing the migration of contaminants to the groundwater. Since wastes will remain at the site in all of the alternatives, five-year reviews of the protectiveness of the remedy will be required.

4. Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 4 through 8 provide extraction and treatment of the groundwater. This will reduce the mobility and volume of the contaminants. Carbon adsorption may reduce the toxicity of the contaminants in the groundwater if these contaminants are destroyed during carbon regeneration. Alternative 7 reduces toxicity by oxidizing VOCs and SVOCs in the groundwater. Treatment of leachate at the POTW reduces toxicity by destroying some of the VOCs and SVOCs. Burning landfill gas reduces its toxicity. Extraction of leachate and gas from the landfill reduces mobility. The fixation of the wastes in Alternative 8 may greatly reduce mobility, but testing would have to be done to determine how much.

5. Short-term Effectiveness

The groundwater extraction in Alternatives 4 through 8 prevents the migration of contaminated groundwater and provides the greatest short-term effectiveness. There is the possibility of a slight impact on local residents from the air stripper emissions in Alternatives 6 and 6a. This would be managed by means of emissions controls if necessary. Handling of the exhausted carbon in Alternatives 5 and 5a and the wastes from the pretreatment units in Alternatives 5, 5a, 6, 6a, 7, and 7a may present some slight risks to workers and to others when wastes from these processes are hauled off site for proper disposal. The amount of wastes to be handled would be expected to be greater in the alternatives that are also treating leachate on site. Installation of groundwater and gas extraction wells and modification of the leachate extraction system may present some risks to the workers. There are some possibilities of risks to residents and workers if the sanitary sewer being used to transport leachate and contaminated groundwater leaked. The extraction of gas and leachate from the wastes provides added protection against the spread of contamination. The cover for the wastes, included in all alternatives except Alternatives 1 and 8, provides protection against contact with wastes and contaminated soils. The implementation of the waste fixation system in Alternative 8 may pose some risks for the workers and the local residents since the wastes must be penetrated.

The landfill would continue to operate until it is full in each of the alternatives involving a final cover system and in the alternative involving the fixation process. This should not expose the workers or local residents to excess risks. The present operation of the landfill includes leachate and gas extraction. The areas of the landfill that are not currently being filled have an intermediate cover. In the alternatives which require a groundwater extraction system, the principal threat identified (contaminated groundwater) would be addressed within a short period of time.

6. Implementability

Among the alternatives, Alternatives 2 and 3 would be the simplest to implement. All of the alternatives should be fairly easy to implement except for the fixation process of Alternative 8. A possible future implementation problem might arise in the alternatives in which leachate is sent to the POTW. These problems may come about if changes in the content of the leachate occur or regulations regarding waste streams that can be sent to a POTW change. Alternatives 5, 5a, 6, 6a, 7 and 7a require a NPDES (National Pollutant Discharge Elimination System) permit for discharge of the treated water into Kilbuck Creek. The permit should be obtainable. Alternatives 6 and 6a require an IEPA air permit, which should also be obtainable. The photolysis/oxidation process and the fixation process are fairly new and would have to be tested before they could be implemented. The air stripping and the carbon adsorption processes are well established and should present few technical problems.

7. Cost

The costs of the various alternatives are presented in Table 2. Alternatives 4, 5, 6, 6a, and 7 cost about the same. Alternative 1 has essentially no cost associated with it. Alternative 8 is much more expensive than the other alternatives.

8. State Acceptance

The State of Illinois supports the selection of the preferred alternative.

9. Community Acceptance

Following the public comment period, community acceptance of the preferred alternative will be evaluated and described in the ROD issued for this remedy.

SUMMARY OF THE PREFERRED ALTERNATIVE

In summary, both Alternatives 5 and 6 will substantially reduce risks to public health and the environment. Extraction and treatment of the groundwater will prevent the migration of contaminated groundwater and will reduce the contamination in the extracted groundwater to levels where it can be safely discharged to the environment. The final landfill cover, and the assurances that it will be properly maintained, would provide for the safe management of the wastes remaining at the site. Ongoing extraction of gas and leachate until these substances no longer pose a problem should significantly reduce the levels of groundwater contamination. Either of these preferred alternatives provides a good balance with respect to the evaluation criteria. Based on available information, U.S. EPA and IEPA have determined that either of the preferred alternatives would protect human health and the environment, would comply with ARARs, would be cost effective, and would use permanent solutions and alternative treatment technologies to the maximum extent practicable. These alternatives would meet the statutory preference for a remedy involving treatment as its principal element because the groundwater would be treated by either carbon adsorption or air stripping, the leachate would be transferred to the POTW for treatment, and landfill gas would be treated through burning.

ROLE OF THE COMMUNITY IN THE PROCESS

U.S. EPA and IEPA encourage the public to comment on all of the remedial alternatives discussed in this Proposed Plan. These comments will be evaluated before the final remedy is selected for the site. For a complete description of the investigation and the alternatives under consideration for the site, interested parties can review the administrative record and other documents available in the following information repository:

Rockford Public Library
215 North Wyman Street
Rockford, Illinois 61101
(815) 965-6731

Written comments will be accepted during a public comment period from April 16, 1991 to May 16, 1991. Members of the community are encouraged to attend a public meeting on Thursday, April 25, 1991, at the Howard Johnson Convention Center at 3909 11th Street, Rockford, Illinois, to discuss the proposed alternatives for cleaning up contamination at the site. Verbal comments will be recorded during the meeting.

Comments received during the public comment period and at the public meeting will be addressed in a Responsiveness Summary which will be included in the ROD, and will be made public in the information repository after the ROD has been signed. To send written comments or obtain further information, both before and after the public meeting, contact:

Cheryl Allen or MaryAnn LaFaire
Community Relations Coordinators
U.S. EPA Region 5
Office of Public Affairs (5PA-14)
230 S. Dearborn Street
Chicago, Illinois 60604
(312) 353-6196 or
(312) 886-1728

Bernard J. Schorle
Remedial Project Manager
U.S. EPA Region 5
Office of Superfund (5HS-11)
230 S. Dearborn Street
Chicago, Illinois 60604
(312) 886-4746

Toll Free Number: 1-800-572-2515 (9:00 am to 4:30 pm Central Time)

GLOSSARY

Administrative Record - A compilation of documents that U.S. EPA either considered or relied upon in selecting remedial or removal actions to be taken at a Superfund site.

Applicable or Relevant and Appropriate Requirements (ARAR) - Federal, state and local laws with which remedial action alternatives must comply.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - A federal law passed in 1980 and amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA). CERCLA created a special tax that goes into a trust fund, commonly known as "Superfund", to be used to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Feasibility Study (FS) - An in-depth study that identifies and evaluates alternatives for cleaning up a site.

Leachate - A liquid (usually rain water) that passes through contaminated soil and landfill waste, and accumulates contaminants from the soil and waste.

Maximum Contaminant Levels (MCL) - Enforceable federal standards for the maximum permissible level of contaminants in drinking water. MCLs are set as close to the Maximum Contaminant Level Goals as feasible.

Maximum Contaminant Level Goals (MCLG) - Health goals established by U.S. EPA for contaminants in drinking water at which no known or anticipated adverse health effects occur, allowing for an adequate margin of safety. MCLGs are not enforceable standards.

Present Net Worth - An economic term used to describe today's cost for a project and reflect the discounted value of future costs. A present net worth cost estimate includes construction and future operation and maintenance costs. Present net worth values are used when calculating and evaluating the costs of alternatives for long-term projects.

Reagent - A substance used because of its chemical or biological activity to produce a product to detect or measure a component.

Record of Decision (ROD) - A document issued by U.S. EPA that describes the corrective action to be taken at a Superfund site. The corrective action is selected after public comments on the proposed plan are considered.

Remedial Investigation (RI) - An in-depth study to determine the nature and extent of contamination at a hazardous waste site.

Resource Conservation and Recovery Act (RCRA) - A federal law that regulates the generation, transport, and disposal of waste. It has nine discrete sections that deal with specific waste management activities. Of most interest for Superfund sites are generally the sections on hazardous waste management, solid waste management, and underground storage tank regulations.

Responsiveness Summary - A document that presents public comments on alternatives for cleaning a hazardous waste site and summarizes U.S. EPA's responses to the comments.

Semivolatile Organic Compounds (SVOCs) - A group of chemicals containing organic carbon that evaporate in air and dissolve in water at a slower rate than VOCs.

Special Wastes - In Illinois regulations, any industrial process waste, pollution control waste, or hazardous waste, except as determined pursuant to the Illinois Environmental Protection Act.

Superfund - A trust fund created under CERCLA that can be used to pay for the investigation and clean-up of abandoned or uncontrolled hazardous waste sites.

Volatile Organic Compounds (VOCs) - Any of a number of chemicals that contain organic carbon and readily evaporate when exposed in air. VOCs are a more significant problem in groundwater than in surface water because they cannot evaporate in the subsurface. Exposure to VOCs over a long period of time may cause health-related problems.

MAILING LIST ADDITIONS AND CORRECTIONS

To be placed on the mailing list to receive information about the Pagel's Pit site, or to make corrections to your address, please send your name, affiliation, address, and phone number to:

MaryAnn LaFaire
Community Relations Coordinator
U.S. EPA Region 5
Office of Public Affairs (5PA-14)
230 South Dearborn Street
Chicago, Illinois 60604

NAME_____

AFFILIATION_____

ADDRESS_____

CITY_____ STATE_____ ZIP_____ PHONE (___)_____

EPA U.S. Environmental Protection Agency
Region 5
Office of Public Affairs
230 South Dearborn Street
Chicago, Illinois 60604

INSIDE: PROPOSED CLEANUP PLAN FOR THE PAGEL'S PIT SUPERFUND SITE